

Remarks/Arguments

Rejections to Novelty of Claims 1 and 17

In the First Office Action, Examiner is of the opinion that many aspects of claims 1 and 17 of the present application are anticipated by European Patent EP 1028455A2 (Kaxuma) and hence do not meet the requirements of 35 U.S.C 102.

Response to Rejections to Novelty of Claims 1 and 17

Applicants submit that Kazuma does not anticipate claims 1 and 17 of the present application as in the opinion of Examiner. This is because the handler and method is for singulating at least one package substrate into a plurality of packaged semiconductor devices by using a water jet. In addition, a first movable mount and a second movable mount are provided. The first movable mount is movable between a loading location and a cutting location to transport a packaged substrate from the loading location to the cutting location. The packaged substrate undergoes cutting at the cutting location. The second movable mount is movable between the cutting location and an unloading location. In addition, the partially cut packaged substrate then undergoes further cutting at the cutting location to produce a plurality of packaged semiconductor devices. The plurality of packaged semiconductor devices is then transported from the cutting location to the unloading location. Both the first movable mount and the second movable mount are adapted to receive the packaged substrate.

In contrast, Kazuma teaches a cutting-and-transferring system for cutting and separating a workpiece into pellets. The system comprises a holding table (16), a cutting unit (11), a transferring unit (12) and a shuttle transfer unit (40). The holding table (16) holds a workpiece to be cut, the workpiece being retained by a holder member. The cutting unit (11) includes at least cutting means (19) for cutting the workpiece on the holding table (16) into pellets. The transferring unit (12) includes at least transferring means (44) for picking up the pellets from the holder member and for transferring to a selected carrier tray (63). Lastly, the shuttle transfer unit (40) transfers a selected cut workpiece from the cutting unit (11) to the transferring unit (12). Although the examiner is of the opinion that Kazuma also teaches the first movable mount (recited as transferring means 14 in Kazuma) and the second movable mount (recited as fourth transferring

means 24 in Kazuma) of the present application, Applicants respectfully submit that the transferring means 14 and the fourth transferring means 24 disclosed in Kazuma serve different purposes. The transferring means 14 in Kazuma is merely for removing and transporting a selected workpiece from the cassette while the fourth transferring means 24 transfers a cut workpiece from the tentative storage area 15 to a boarding area 23 where the cut workpiece is picked up to be transferred from the cutting unit 1, particularly the tentative storage area 15 to the transferring unit 12. Hence, as evident from the foregoing explanations, the transferring means 14 and the fourth transferring means 24 only act as transporting and transferring platforms for the cutting-and-transferring system of Kazuma.

This is radically different from the teachings of claims 1 and 17 of the present application as both the first and second movable mount not only transport and transfer the package substrate secured thereon, they also serve as platforms for securing and to thereby enable cutting of the secured packaged substrate by use of a high pressure water jet. Specifically, the package substrate is first cut widthwise in an "x" direction and then transferred from the first movable mount to the second movable mount. Subsequently, the partially cut packaged substrate, now being secured on the second movable mount, is then cut lengthwise in a "y" direction to obtain a plurality of singulated, packaged semiconductor devices. The singulated, plurality of packaged semiconductor devices is then transported to a packing machine by a pick and place assembly. Hence, the operational functionalities of the transferring means 14 and the fourth transferring means 24 disclosed in Kazuma are completely different from those of the first and second movable mounts of the invention of the present application. Furthermore, Kazuma is intended for used as a standalone system whereas the invention of the present application is to be used as part of an inline system. Applicants respectfully submit that Kazuma is unsuitable for implementation as part of an inline system since the unloading and loading functions are duplicated.

More importantly, Kazuma differs from the description of claim 1 of the present application and hence produces different functional and operational effects. Specifically, during transfer of the packaged substrate in Kazuma, there is a change in both the

location and the holder of the packaged substrate. Column 5, paragraph 1 in Kazuma describes the transfer being completed when the first transfer unit moves the workpiece from the tentative area to the holding table (i.e. location change) and passes the workpiece from the first transfer unit to the holding table (i.e. holder change).

Claim 1 of the present application describes the packaged substrate transfer being completed when the first movable mount is moved from the loading location to the cutting location (i.e. location change) with the packaged substrate still being secured on the first movable mount even during subsequent singulation (i.e. no holder change). Even during transfer from the first movable mount to the second movable mount (i.e. holder change), the transfer is completed without the packaged substrate moving away from the cutting location (i.e. no location change). This is only possible with the provision of two mounts for holding the packaged substrate during cutting and enabled by the two mounts being movable (i.e. each mount performs transfer function and holding function).

Thus in the present application, this consequently enables a new packaged substrate to be preloaded onto the first movable mount whereat cutting is to be performed (i.e the first movable mount) at the same time when the previous packaged substrate on the second movable mount is being singulated at the cutting location. This differs entirely from Kazuma as the element configuration and implementation requirement of Kazuma requires the holding location to be vacated before a workpiece can be positioned thereon for cutting. Obviously, the holding location cannot be vacated when the workpiece thereon is still being processed. This consequently prevents the invention disclosed in Kazuma from performing simultaneous workpiece positioning and cutting which is only possible as taught by claim 1 of the current application.

Therefore in accordance with the above response, reconsideration and withdrawal of the objections to novelty of claims 1 and 17 are respectfully requested.

**Rejections to Novelty of Claims 7-12, 15-16, 18-19, 24-26, 28 and 30**

Examiner is of the opinion that many aspects of claims 7-12, 15-16, 18-19, 24-26, 28 and 30 are disclosed by Kazuma following from the objections of claim 1 and 17. Hence, Examiner is of the opinion that claims 7-12, 15-16, 18-19, 24-26, 28 and 30 lack novelty.

Response to Rejections to Novelty of Claims 7-12, 15-16, 18-19, 24-26, 28 and 30

Applicants submit that claims 7-12, 15-16, 18-19, 24-26, 28 and 30 are inventive over Kazuma. Specifically, claims 7-12 and 15-16 further add elements to the handler of claim 1 while claims 18-19, 24-26, 28 and 30 further add operational features and specifically provide operation aspects additions to the method of claim 17.

Hence, Applicants respectfully submit that in accordance to the above response explaining that since the handler and method of claims 1 and 17 for singulating at least one package substrate into a plurality of packaged semiconductor devices by using a water jet are not disclosed by Kazuma, Applicants submit that the handler and method of claims 1 and 17 would not then have been available to a person skilled in the art at the time of invention to improve upon to arrive at each of claims 7-12, 15-16, 18-19, 24-26, 28 and 30. Therefore, claims 7-12, 15-16, 18-19, 24-26, 28 and 30 are submitted to be novel.

Therefore in accordance with the above response, reconsideration and withdrawal of the rejections of claims 7-12, 15-16, 18-19, 24-26, 28 and 30 are respectfully requested.

Obviousness Rejections of Claims 2-6, 20-23, 27 and 29

Examiner is of the opinion that claims 2-6, 20-23, 27 and 29 are obvious and unpatentable over Kazuma in view of International Application WO 02/35585A1 (Cole). As a result, claims 2-6, 20-23, 27 and 29 are rejected under 35 U.S.C. 103(a).

Response to Obviousness Rejections of Claims 2-6

Claims 2-6 recite technical features of the water jet used for cutting the packaged substrate mounted on the first and second movable mounts. In addition, claims 2-6 also recite positioning of the water jet with respect to the packaged substrate that is secured on the first and second movable mounts during operation of the handler of the present invention.

Applicants submit that each of claims 2-6 needs to be read in totality in combination with claim 1 when interpreting the claimed invention of the present application. Applicants further submit that although Cole discloses an apparatus and method to cut irregularly shaped die from a wafer using a fluid jet cutting system, it would

not have been obvious for a person skilled in the art to combine Kazuma with Cole to arrive at each of claims 2-6. This is because the invention of Cole is specifically used for cutting irregularly shaped dice from a wafer such as planar light-wave circuit device while the invention of Kazuma is used for cutting and transferring of pellets that are cut from a workpiece being worked on. Hence the invention of Kazuma and the invention of Cole are meant for application under different manufacturing situations and it would not have been obvious to combine them to arrive at the invention of the present application. In addition, Cole merely discloses methodologies for cutting irregularly shaped die and the related characteristics of the required supporting materials. In contrast, the invention of the present application teaches the use of the water jet in conjunction with the entire machine for cutting the packaged substrate. Hence, Cole is of a different subject matter with regards to the present application. Furthermore, even after combining Kazuma and Cole, the invention of the present application cannot be obtained due to the fact that the functionalities of the transferring means 14 and the fourth transferring means 24 disclosed in Kazuma are totally different from the first and second movable mounts as disclosed by the invention of the present application.

For at least these reasons, Applicants submit that claims 2-6 are allowable and respectfully requests reconsideration.

Response to Obviousness Rejections of Claims 20-23, 27 and 29

Claims 20-23, 27 and 29 recite further sub-steps of the method of claim 17 for usage of the water jet for cutting the package substrate secured either on the first movable mount or second movable mount. Specifically, each of claims 20-23, 27 and 29 recite steps for positioning of the water jet to thereby enable cutting of the packaged substrate.

Applicants submit that each of claims 20-23, 27 and 29 needs to be read in totality in combination with claim 1 when interpreting the claimed invention of the present application. Additionally, Applicants submit that although Cole discloses use of a water jet for cutting a plurality of dice from a wafer, the invention of Cole is used for cutting irregularly shaped dice from a wafer while the invention of Kazuma is used for cutting and

transferring of pellets that are cut from a workpiece being worked on by the invention of Kazuma.

In addition, Kazuma does not disclose the steps (b) to (e) as recited in claim 17. Hence, even after combining Kazuma with Cole, the invention of the present application cannot be obtained. Thus, Applicants respectfully submit that in accordance to the above response explaining that Kazuma does not disclose the subject matter of claim 17 of the present application, a person skilled in the art at the time of the invention would not have been able to combine Kazuma with Cole to arrive at the invention disclosed by the present application.

Therefore in accordance with the above response, reconsideration and withdrawal of the obviousness rejection of claims 20-23, 27 and 29 are respectfully requested.

Rejections to Obviousness Rejection of Claims 13-14

Examiner is of the opinion that claims 13-14 are obvious and unpatentable over Kazuma in view of U.S Patent Application No. 20010043076 (Itasaka). As a result, claims 13-14 are rejected under 35 U.S.C. 103(a).

Response to Obviousness Rejections of Claims 13-14

Claims 13 and 14 recite the provision of movably mounted image capture devices directed at the loading and cutting locations for capturing images of the package substrate on the first movable mount and the second movable mount respectively.

Applicants submit that each of claims 13-14 needs to be read in totality in combination with claim 1 when interpreting the claimed invention of the present application. Further, Applicants respectfully submit that in accordance to the above response explaining that the functionalities of the transferring means 14 and the fourth transferring means 24 disclosed in Kazuma are totally different from the first and second movable mounts as taught by the invention of the present application. Hence, the subject matter in Kazuma is different from that as disclosed by the present application. In addition, Applicants submit that the image processing technique as taught in Itasaka provides functionalities such as checking the positions of the semiconductor devices and performing adjustment corrections if necessary. In contrast, the present application uses the camera and the image processing technique for performing row-wise alignment of the

package substrate. Yet additionally, Itasaka relates to matter for testing of semiconductor devices whereas the present invention as disclosed relates to matter for semiconductor dicing. Hence, the subject matters of Itasaka and Kazuma are totally different and it would not have been obvious to combine them to arrive at the invention of the present application.


Applicants further submit that even with the combination of Kazuma and Itasaka, a person having ordinary skills in the art would not be able to arrive at the invention of the present application. This is despite the fact that Itasaka discloses image capturing devices (CCD cameras 57, 58A, 58B and 60) which is analogous to the movably image capture devices as disclosed in claims 13 and 14 of the present application.

Thus, Applicants respectfully submit that it would be non-obvious for a person skilled in the art at the time of the invention to combine Kazuma with Itasaka to arrive at claims 13 and 14. Applicants respectfully submit that each of claims 13-14 is in condition for allowance.

### CONCLUSION

Applicants respectfully request reconsideration and that a timely Notice of Allowance be issued in this case. In the event that an extension of time is necessary to allow for consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required (including fees for net addition of claims) are hereby authorized to be charged to Texas Instruments Incorporated's Deposit Account No. 20-0668 for such fees.

Respectfully submitted,

  
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